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HARNESSING THE TIDES.

THE work of harnessing Niagara having proved successful, the question of obtaining similar power for generating electricity in cities begins to assume an importance never before appreciated, and it is only a question of time before the problem will be solved to the eminent satisfaction of thousands of town dwellers. The presence in our cities of steam boilers and engines scattered throughout the most crowded and over-heated sections is a constant source of irritation and unhealthfulness, and the substitution of electricity brought from a convenient distance outside of the city limits for the present huge steam plants would prove a boon that even the densest could readily comprehend.

The experiment with Niagara has shown sufficiently that with such power at hand a city like Buffalo (or New York, for that matter, if within a reasonable distance) can be heated, lighted and all necessary machinery run by electricity generated at a cost less than one-half of that produced from coal. This electric current could be conducted across the continent if the necessary installation of the plant was not so costly. Sources of power nearer at home, however, will probably prevent the lighting of New York by electricity brought from Niagara. The question of utilizing the tides of the rivers, bays and inlets along the Atlantic Coast for generating power is not a new one; but recent developments in electrical matters bring up the matter again in a new light. Within the last few years electricity has entered the field as a formidable competitor with steam, and the real status of the question cannot be determined until some of the experiments now in the process of development have been completed.

The tides of the North and East rivers produce power enough to generate all the electricity required to light New York and Brooklyn, to do all the mechanical work in the factories and machine shops, and to run all the railroad lines in the city and suburbs. This power is wasted, as formerly all of the power of Niagara was allowed to expend itself in a profitless way. All that is required is to store this immense power and to turn it into profitable use. The problem presented differs somewhat from that at Niagara. The tides are periodic, and not constant, and the power would have to be collected at the times of its greatest exertion and stored for later use.

The Niagara people have already proposed to run a line to New York to do what the tides of the Hudson and East rivers would accomplish right at home. Either undertaking is a large one, requiring the expenditure of millions of dollars. But the results would more than justify the outlay. An inexhaustible supply of power from outside would prove a blessing that could hardly be appreciated to-day. The present cumbersome delivery of coal to factories and private houses would be abolished, and a clean, neat, pleasant method substituted. The plant could be located at some convenient place in the suburbs, or along the river front, where the city air would not be vitiated and poisoned by coal gases, dust, and smoke.

What applies to New York and Brooklyn would apply to many other cities. The tides of the Delaware and Chesapeake could be converted into inexhaustible power to give the cities along that coast a perfect and cheap electric plant. The great inland rivers are not so constant in the summer season as the tides of the rivers and bays along the Atlantic coast. The rush of the waters through the narrow inlets of our bays and rivers is so tremendous that enormous machinery could be propelled at a cost representing a small percentage on the capital invested in the plant. The present outlook

is that the Niagara Falls Power Company will in time run an electrical conduit to New York to supply the motive and lighting power of the city and suburbs, unless some enterprising body of capitalists undertakes to utilize the wasted power of the tides nearer at home. A conduit capable of bringing 100,000 to 200,000 horse power from Niagara would cost more than a four-track steam railway. The investment of a similar amount in collecting and storing the power of the tides in the North and East rivers ought to yield better results.

Greater New York represents the largest power market in the country, and through the ever-increasing suburban traffic the demand for this power will increase. The trolley lines are running in all directions from the city, penetrating farther and farther into the suburbs, and with each new line the demand for electric power becomes greater. Electricity is destined to supplant steam in the short hauls, and it is only a question of time before all of the suburban traffic is carried on by this power. Where railroad lines enter the cities through tunnels the electric engines are sure to become more popular than the steam engines. They have already supplanted the steam engines in Baltimore and other large cities, and the freedom from dust, ashes, smoke and gases, is a boon that every citizen appreciates. The most complete electric terminus of a great steam railroad running into a city is that of the Baltimore & Ohio. The Belt Line Tunnel runs under the city of Baltimore for a distance of one and a quarter miles, and then through small tunnels and cuts into the suburbs. The total length of the electric line equipped is about three miles. When the steam engines and train come to the mouth of the tunnel, the electric engines are simply to haul them through the underground passage of the city to the open country beyond. This system has not been adopted for the sake of economy, but for the convenience and comfort of the patrons of the road. The example set may bring other great railroads entering our cities to a proper sense of their duty to the public, if they wish to retain patronage.

The question of lighting and heating the cities and private houses by the electric power brought from a general storage house outside of the city limits, commends itself to every one. Cooking by electricity is the only modern and improved way. It can be done without heating the room, and without the bother of using wood or coal. The electric heating stoves are regulated so easily by a series of handles and knobs that no one could fail to like them. There is no loss of fuel as at present. When the cooking is finished the current is turned off, and no unnecessary waste follows. The heat is ready at hand on a moment's notice. A slight turn of a knob provides heat enough instantly to broil the steak or to cook the potatoes. The power of the heat can be made constant by a small regulator, so that one knows exactly the intensity of the unseen fire.

Our present system of running machinery compels the erection of small steam plants all over the city. Every hotel, office building, large apartment house, and manufacturing loft must have its steam plant to run an elevator and to heat the building. The steam companies attempt to economize for the individual house owner by running their pipes into the buildings and supplying the power from some central point. But even this system imposes great expense. The steam companies must pay good prices for their coal, and the cost of running the pipes through the streets is as great as that of gas or water pipes. An electric plant could supply through its one con-

duit all the power and light that the gas and steam companies now furnish through their numerous intricate net works of pipes. The cost could be reduced one-half; the service could be made far more satisfactory, and the city redeemed from many of its present foul odors and an unpleasant, superheated atmosphere. The boon would not simply be one of economy and cleanliness, but one of healthfulness as well.

In a few years it is predicted that electricity will have entered into our city life to the full extent described above, and the first in the field to obtain control of the power will reap profits that cannot be estimated. But where this power will ultimately come from is an unsettled question. It would seem, however, that the tides along our coast might furnish the cheapest and most effective power for such an undertaking if they could be controlled and harnessed as effectually as Niagara has been in the last few years.

GEO. E. WALSH.

RURAL FREE MAIL DELIVERY.

A BETTER mail service in the city than in the country is, by reason of the greater density of population in the first named, consistent with "the greatest good to the greatest number," and, therefore, is a part of good government; but the disparity between the mail service in the city and in the country has become greater than is warranted by justice or the public welfare. The estimated receipts of the post-office department for the current fiscal year equal the expenditures of the preceding year; and it is generally conceded that the finances of the department have, notwithstanding the business depression, reached a point that justifies a decided improvement in the mail service. One cent letter postage would aggravate the inequality between the mail service of the city and of the country. That rural free mail delivery is the more equitable is so apparent that its opponents are compelled to limit their arguments to an exaggeration of its cost and the assertion that the people do not want it. But the people do want it. There is not a single agricultural paper that does not heartily advocate it. There is not a national farmers' organization that is not earnestly working for it. During the past year two hundred subordinate farmers' organizations have pronounced in its favor. The leading dailies everywhere advocate it. Just as the people understand the situation are they in favor of it, once more demonstrating that intelligent public sentiment is wise and just.

Mr. Wanamaker's experiments, set forth in his able reply to Senate resolution of January 13, 1892, demonstrated that free delivery in towns and villages would not add to the net expense of the department. With free delivery on farms would grow up an express and telegraph messenger service that, while being of great benefit to farmers, would yield such profit to the carrier that the bids for free delivery would soon be greatly reduced. Mail could be delivered by those not capable of earning high wages, and the number of offices could be lessened. In an agricultural township now having five or six offices, all but one could be abolished, and two boys on ponies could deliver the mail daily. This would effect an actual saving. In the more sparsely settled regions, boxes along the star routes would suffice for some years. All that is asked for has been well expressed by the Farmers' National Congress: "That free mail delivery be extended into towns and villages and to farms as rapidly as possible without making an onerous increase in the net expense of the post-office depart-